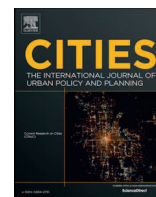




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Q2 Historical trajectories of currently shrinking Portuguese cities: A typology of urban shrinkage

Q3 Daniel Alves^{a,*}, Ana Paula Barreira^b, Maria Helena Guimarães^{b,c}, Thomas Panagopoulos^b

^a Faculty of Social and Human Sciences, New University of Lisbon, Av. de Berna, 26-C, P-1069-061 Lisbon, Portugal

^b Research Centre for Spatial and Organizational Dynamics (CIEO), University of Algarve, Campus de Gambelas, Building 9, P-8005-139 Faro, Portugal

^c Landscape Dynamics and Social Processes Group, Instituto de Ciências Agrárias e Ambientais Mediterrânicas (ICAAM), University of Évora, Núcleo da Mitra, Edifício Principal, Apartado 94, 7002-554 Évora, Portugal

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ABSTRACT

Cities develop according to different patterns, undergoing population growth during some periods and decline (shrinkage) during others. Theories attempting to understand these behaviours include: 1) shrinkage is a natural process in the life cycle of a city, alternating with periods of growth, or 2) shrinkage is an extreme event that places cities into a continuous decline process with no return to population growth. We use retrospective data over a period of 130 years to study 25 Portuguese cities currently facing population decline, and show that both theories coexist in time and space. Five types of shrinking city are revealed: “Persistent Early Shrinkage” due to exodus from the rural periphery, “Metropolitan Shrinkage” due to the challenges of urban sprawl, “Recent Shrinkage” in de-industrialisation hotspots, “Cyclic Shrinkage” occurring in political transformation cores, and “Mild Shrinkage” due to life-style disamenity. As diversity of city population trajectories appears to be the norm in both Portugal and other Western European countries, the incorporation of this range into the management of urban transitions is recommended in order to reinforce city resilience.

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1. Introduction

Population decline in cities has been reported throughout history (Beauregard, 2009; Oswalt & Rieniets, 2006). Urban development has complex stages of growth, stagnation, and decline. The dynamics of growth and shrinkage are well described in the urban life-cycle theory (van den Berg, Klaassen, Rossi, & Vijverberg, 1982), in which periods of population boom alternating with population decline are interpreted as a natural cycle; however, more recent observations have questioned this view (Champion, 2001; Metzger, 2000). The emergence of the concept of shrinkage and the hypothesis of a continuous (no-return) process of decline associated with drivers such as economic transformations, demographic changes, suburbanization, and political and environmental transformations have brought about a new way of looking at the phenomenon of urban population loss.

The two theoretical branches of urban development, namely, urban life cycle and continuous decline, are often regarded separately, with most of the relevant literature supporting one or the other (e.g. Friedrichs, 1993; Mykhnenko & Turok, 2008). The urban life cycle can be explained with resilience theory (Holling, 1973) and the product-

life-cycle model (Levitt, 1965), where long-established cities eventually become less popular, although resilience allows some of them to self-organize in response to sudden changes, which have become more unpredictable under globalization. Continuous decline can be understood in terms of the post-Keynesian regional growth theory, which supports the argument that disparities between territories in regards to per capita income are permanent and self-perpetuating and can be reinforced by certain events as explained by cumulative causation mechanisms (Alexiadis, 2013). Nevertheless, a combination of the two approaches (life cycle and continuous decline) might prove productive for explaining population migration flows, given the flexibility that would be introduced into the analysis (Haase, Bernt, Grobmann, Mykhnenko, & Rink, 2013; Haase, Rink, Grossmann, Bernt, & Mykhnenko, 2014).

In the present work, we empirically demonstrate that cities develop according to different patterns of transition between growth and decline. The study tracks population figures during 130 years in 25 shrinking Portuguese cities. Here, as in Beauregard (2009) and Turok and Mykhnenko (2007), depopulation is viewed as an indicator of urban decline. This paper presents a historical perspective of shrinkage by examining demographic, economic, political, and social drivers of the phenomenon. The identification of different patterns of urban evolution adds insights to the phenomenon of shrinkage in Portugal, as well as to the overall discussion regarding urban theories used to explain population decline.

* Corresponding author.

E-mail addresses: alves.r.daniel@gmail.com (D. Alves), aprodrig@ualg.pt (A.P. Barreira), mguimaraes@ualg.pt (M.H. Guimarães), tpanago@ualg.pt (T. Panagopoulos).

2. Literature review

The way in which cities evolve, showing periods of population increase followed by periods of inhabitant decline, has received attention from scholars since the early works of urban planners Rust (1975); Berry (1977), and van den Berg et al. (1982). This cyclic process has been given different designations, including decline, decay, abandonment, deurbanization, urban crisis, and demographic change (Haase et al., 2014). However, only after the 1980s did the term 'shrinkage' begin to appear in the literature, most probably because this type of transformation had by that stage reached more countries and cities (Oswalt & Rieniets, 2006; Turok & Mykhnenko, 2007). Beauregard (2009) referred to shrinking cities as pertaining only to those U.S. cities that had lost population since the 1980s, with cities that had undergone reductions in inhabitants during the periods 1820–1920 and 1950–1980 being defined as aberrant and declining cities, respectively. In Europe, urban decline has been reported in the Anglo-Saxon literature since the end of WWII and urban shrinkage has been introduced more recently (since the late 1980s) by German scholars (Hoekveld, 2014).

An initial examination of urban population evolution leads to the conclusion that episodes of growth and decline have been part of the life cycle of the city. According to this view, European urban transformation in the past two centuries followed such a pattern, showing a sequence of urbanization, suburbanization, and deurbanization (van den Berg et al., 1982; Buzar et al., 2007). Facing city shrinkage, local governments developed and implemented policies aimed at attracting back the people who had previously left cities for the suburbs or other towns. Nevertheless, some other studies have reported population decline as a continuous process rather than a cyclical one (Metzger, 2000). Champion (2001) argued that the development of Western Europe since the 1970s had created a variety of life-course trajectories of urban development.

Life-cycle and continuous-decline theories are usually approached separately, meaning that empirical observations have led to supporting one or the other. The fact that the theories evolved in different periods and within their own disciplinary perspectives probably explains this. However, as pointed out by Haase et al. (2013), the two views can coexist. In fact, a bridge between the two approaches would add flexibility and an integrative analysis of population decline, because historical trajectories portray plural shrinkage realities rather than invariant processes (Haase et al., 2014).

Studies of how the populations of cities evolve cover a range of durations, with shrinkage being observed over both long and short periods of time. Beauregard (2009) studied the large cities of the U.S. over two periods, 1820–1920 and 1950–2000, and found that cities lost inhabitants over both long and short time frames. Mykhnenko and Turok (2008) examined city evolution between 1960 and 2005 for Eastern European countries, and found a medium-term decline (during the last 15 years) as the predominant trajectory, followed by a recent decline (during the last 5 years). Turok and Mykhnenko (2007) analysed a set of European countries for the same time span, and found that the shrinkage of cities in Western Europe is less prevalent than that in Eastern Europe. However, those authors identified population decline in 22% of the Western European sample cities and 13 of these registered long-term decline (lasting 25 years).

The phenomenon of shrinkage has been studied using various sets of countries (e.g. Rieniets, 2005, for Western European countries; Mykhnenko & Turok, 2008, for Eastern European cities; Turok & Mykhnenko, 2007, for both Western and Eastern European cities; Großmann, Haase, Rink, & Steinführer, 2008, for several Poland and Czech Republic cities; and Beauregard, 2009, for the United States). Besides searching for the pattern of urban shrinkage, those studies also investigated the underlying causes and suggested diversified typologies, promoting a continuing and intense debate about how to best understand the phenomenon (Haase et al., 2013; Hoekveld, 2014).

The main types of shrinkage identified in Western Europe are those relating to deindustrialization, suburbanization, comparative disadvantages due to globalization, political and environmental transformations, and demographic changes (Haase et al., 2014; Oswalt & Rieniets, 2006). Wu, Zhang, Chu, and Chu (2013) rearranged the typologies around three concepts: "shrinkage is imposed", which includes political, economic, and environmental crises; "shrinkage due to comparative disadvantages", which relates to differences between places in economic opportunities, lifestyles, and/or climatic conditions; and "shrinkage due to societal/global changes", which includes fertility decline, ageing, resource depletion, and climate change. In many cases, there are overlapping reasons for the loss of population (Cortese, Haase, Grossmann, & Ticha, 2014; Couch, Karecha, Nuissl, & Rink, 2005).

During the 1950s, industrialisation caused a flow of population from urban hinterlands into city centres in northern Europe (Cheshire, 1995). The decline in population after deindustrialisation in Europe was a process that first affected the northern countries, after the 1970s, and subsequently reaching countries in southern Europe.

Changes in the economic profiles of cities promoted new preferences of city residents who, supported by the availability and accessibility of transportation options, moved out of city cores, leading to urban sprawl and suburbanization (Clark, 1989; Couch et al., 2005). In Europe, these processes impacted first the northern countries (in the 1950s) as a result of the greater wealth of the inhabitants of these countries, and then gradually spread into southern countries (Cheshire, 1995).

Globalization has affected cities and countries unevenly (Martinez-Fernandez, Audirac, Fol, & Cunningham-Sabot, 2012; Oswalt, 2005), with smaller cities and those not included in international networks being the most affected (Cunningham-Sabot & Fol, 2007; Elzerman & Bontje, 2015). The neoliberal economic trend that emerged from the post-Fordist period has challenged the capacity of former industrialized cities to retain inhabitants. Globalization has also brought a new role to suburbs, with some of them emerging as new development poles, at the expense of increasingly empty city centres (Audirac, Cunningham-Sabot, Fol, & Moraes, 2012; Martinez-Fernandez et al., 2012). As such, deindustrialization and suburbanization have affected mainly larger cities, but more recent economic transformations have caused population loss and economic declines across a broader spectrum of cities.

Political and environmental drivers have also been used to explain population loss (Großmann et al., 2008; Oswalt & Rieniets, 2006). The fall of the Berlin Wall had a very substantial impact on the cities of the former East Germany, and epidemics as well as environmental shocks have been identified as causes of population decline (Cheshire & Magrini, 2006; Vale & Campanella, 2005). Further, demographic changes that emerged from reductions in fertility rate have also promoted a decrease in the number of inhabitants living in cities (Klingholtz, 2009).

Table 1 proposes a shrinking city typology that summarizes the international reports of city shrinkage referred to above. The main shrinkage types reflect societal and global changes and comparative disadvantages (Wu et al., 2013). The scalar dimension of the different causes of shrinkage, city size, and the location of shrinking cities should also be taken into consideration (Geys, Heinemann, & Kalb, 2007). Furthermore, when categorizing shrinking cities, the time span of the process should be considered. According to Turok and Mykhnenko (2007), a separation between episodic and continuous shrinkage should be taken into account to describe the historical dimension and to separate long-term trends from short-term 'events'. The causes identified for each type of shrinkage overlap to a large extent those described by Oswalt and Rieniets (2006), aggregating causes such as low fertility rates, changes in economic profile, legal constraints due to changes in political regime, and lifestyle transformations, as well as reasons related to climate, all of which emerge from demographic, economic, political, social, and environmental drivers.

Table 1
Developed typology of shrinking cities.

Type of shrinkage (TS)	Location (L)	City size (S)	Time (T)	Driver (D)	Cause (C)
1. Due to comparative disadvantage	1. Coastal or metropolitan area	1. Large	1. Cyclical 2. Recent	1. Demographic 2. Social	1. Ageing/low birth rate/migration 2. Suburbanization/lifestyle/infrastructure
2. Due to societal and global changes	2. Rural/periphery	2. Medium 3. Small	3. Medium-term 4. Long-term 5. Episodic	3. Political 4. Economic 5. Environmental	3. Protectionism/reforms 4. Economic decline of sectors/jobs/housing 5. Natural hazards/climate change/resource constraints

Note: This generic typology is subsequently applied to the five types of shrinking city in Portugal described in Section 4. To illustrate its use here, we employ as an example the shrinking Portuguese cities included in type 2: These cities have undergone a shrinkage process due to societal and global changes (TS2), are located in coastal/metropolitan areas (L1), are large cities (S1) that show medium-term periods of shrinkage (T3) driven by social factors (D2) that cause suburbanization and changes in lifestyle and in infrastructure (C2). Given this categorization, type-2 cities are identified as depicting the city type of “Metropolitan Shrinkage” facing the challenges of urban sprawl.

Up to the 1990s, the phenomenon of urban decline was not even mentioned in the Portuguese literature when a long-term analytical perspective was adopted, as it was considered essentially irrelevant or merely a one-time event (Nunes, 1989; Silva, 1997; Soares, 1998). It was even stated that Portugal, contrary to what was already occurring in other European cities, would “probably never” go through this phenomenon (Gaspar & Jensen-Butler, 1992, p. 461). In contrast, although without referring explicitly to the concept of urban decline, Reher (1994) claimed that some Portuguese cities would likely “follow and inclusively accentuate the stagnation and decay that was already found between 1981 and 1991” (p. 22). In a more recent study, also using a long-term perspective, Moreira, Rodrigues, and Henriques (2009) reported some cases of contemporary urban decline for the period 1993–2004 detected through “general indices of demographic, economic and social well-being” (p. 102). The closest reference to “urban decline” in studies of Portuguese cities was presented by Soares (1998) in his analysis of urban system development. By examining the evolution of population between 1981 and 1991, he hypothesised that Lisbon, Oporto, and their respective metropolitan areas may have already been undergoing “urban decline” (shrinkage), although considered that this was a “premature hypothesis, requiring further research” (p. 149). It should be noted that with the exception of the investigations of Reher (1994) and Soares (1998), the various studies of population change in Portugal have been based on municipality- or even district-level data and not on city-level data, and hence suffer from the limitations that derive from aggregating mainly rural inhabitants with urban populations.

3. Methodology

There are several proposed definitions of shrinking cities (e.g. Beauregard, 1993; Pallagst et al., 2009). For the present work, an adaptation of the definition proposed by the COST Action (CIRES) – Cities Regrowing Smaller (COST, 2012), was used. A shrinking city is defined here as an urban area with more than 3000 residents in 1991 and which underwent a population decline for at least 10 years in the period 1991–2011. These cities have undergone a cyclic decline or a recent, medium-term, or long-term decline and present symptoms of a structural crisis as a result of economic, political, or social transformations.

The life-cycle process, as described above, generates a cyclic decline in population, and contrasts with an episodic decline, which is related to a single event. The definition of recent, medium-term, and long-term decline used in the present study is similar to that of Turok and Mykhnenko (2007), but since a wider temporal range is considered here, the terms correspond, respectively, to population decline since the 1990s, the 1980s, and the 1940s/1950s/1960s. A city is considered under a “structural crisis” when a profound demographic or economic transformation occurs, leading to a shift in the city’s basis for development in order to recover.

By using as a reference the time span of shrinkage crossed with its drivers, and trying to overcome the methodological shortcomings of previous studies of the evolution of the Portuguese urban population, a historical series of census data at the level of the parish¹ was used for the period 1878–2011. The parishes used are included in the delimitations of the cities and are predominantly urban. The use of the “parish” as the unit of interest was adopted because data at the spatial unit of “city” started to be measured only in 2004 when the Portuguese National Statistical Institute (INE) introduced this level of data aggregation. Therefore, only the “parish” was a stable unit during the period of interest and was therefore considered the best proxy available. The use of the “city” as the sum of parishes that constitute it allowed urban demographic evolutions to be tracked on a broad temporal basis, and interpolating the census data to the 2011 city boundaries allowed the modifiable areal unit problem to be overcome, using the methodology presented by Silveira, Alves, Painho, Costa, and Alcântara (2013). Overall, 25 cities that showed a declining population trend between 1991 and 2011, identified as currently shrinking cities by Guimarães, Barreira, and Panagopoulos (2014), were used in the analysis. Our analysis of the population data from 1878 to 2011 allowed five types of shrinking city to be identified. These five types of shrinking city in the Portuguese case were also characterized using the generic typology presented in Table 1.

4. Population trajectories and typology of currently shrinking Portuguese cities

The majority of studies of the Portuguese urban system converge towards a conception that its evolution has been characterized by a moderate, if sometimes slow, and constant rate of growth (Moreira et al., 2009; Nunes, 1989, 1996; Silva, 1997; Soares, 1998) (Fig. 1). The trajectory of population values for the combined 25 currently shrinking cities is always shallower than that for the rest of the country (excluding inhabitants in cities), but until 1981 follows the major fluctuations identified for the remaining (121) Portuguese mainland cities. However, after 1981, the shrinking-cities and rest-of-country trajectories clearly diverge, with a persistent urban population decline occurring in the 25 cities while the rest of the country recovered from the relative stagnation experienced in the 1980s. Since 1878 until 2011, the Portuguese urban system was being consolidated around three main axes: (1) A polarization around two large cities, Lisbon and Oporto, which clearly stand out from the other Portuguese cities and which gave rise to the only two metropolitan areas, currently containing nearly 4 million

¹ The parish is a political unit with management responsibilities in coordination with the municipality. The municipality combines a certain number of parishes and is the political unit appointed to manage the affairs within its area. One municipality can include several cities, but one city is defined as the headquarters of the municipality. The existing cities in Portugal vary largely in terms of area, from those where the municipality area is the same as the city area (e.g. Lisbon) to those that cover a portion of one parish (e.g. Moura).

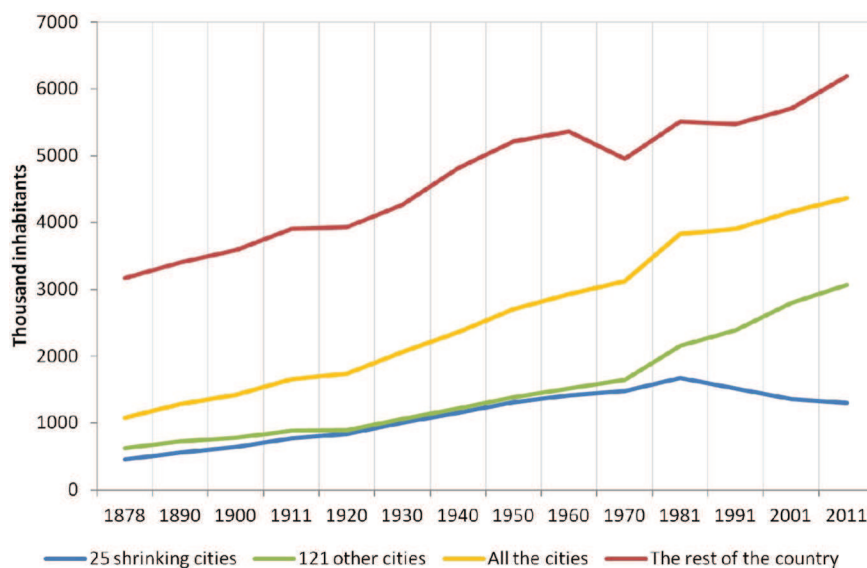


Fig. 1. Number of inhabitants in the cities of the Portuguese mainland.

people; (2) a small set of about forty medium-sized cities, mostly between 20,000 and 150,000 inhabitants, corresponding to satellite cities of the two metropolitan areas and also to several district capitals, overall accounting for around 1.8 million inhabitants; and (3) about 200 small urban centres, mostly with fewer than 10,000 inhabitants, which form a denser complementary network in the centre and north of the country, containing about 1.7 million inhabitants (Ferrão & Marques, 2003, pp. 11–13).

By examining the population evolution of the 25 shrinking cities, they were categorized into five types, presented in Figs. 2 to 6, respectively. This categorization differentiated the cities according to location and to population trajectory. The trajectories show some cities as being more resilient to shrinkage than others, probably explained by a combination of factors, although identifying which particular factors were involved lies beyond the scope of the present study. After the cities had been categorized, absolute and relative population changes for the 25 cities over the period 1991–2011 were calculated, and are reported according to typology in Table 4; the locations of these cities are shown in Fig. 7, coded by city type. Table 4 indicates that all cities

declined in the number of inhabitants over that period, in accordance with the definition of shrinking city described in the methodology.

The cities grouped in type 1, “Persistent Early Shrinkage: Exodus from rural periphery” (classified in Table 1 as TS2, L2, S3, T4, D4, and C4), are characterized predominantly by slow and long-duration changes, under population growth recorded between 1878 and 1950/1960 and population loss thereafter due to a movement out of agricultural activities (Fig. 2). Cities affected by persistent early shrinkage are capitals of hinterland municipalities, with the exception of Alcácer do Sal, and appear to have been unable to resist the economic and population changes that emerged after World War II. These cities are located in areas traditionally focused on the agricultural sector and were most likely affected by the “transfer of industrial jobs from the interior to the coast” (Mata, 2008, p. 178) that occurred during the first half of the twentieth century. Those cities and municipalities evolved in a path of divergence compared with the coastal cities, in accordance with the predictions of post-Keynesian regional growth theory.

The way in which the population in shrinking Portuguese cities evolved (Fig. 1) was influenced mostly by the population trajectories

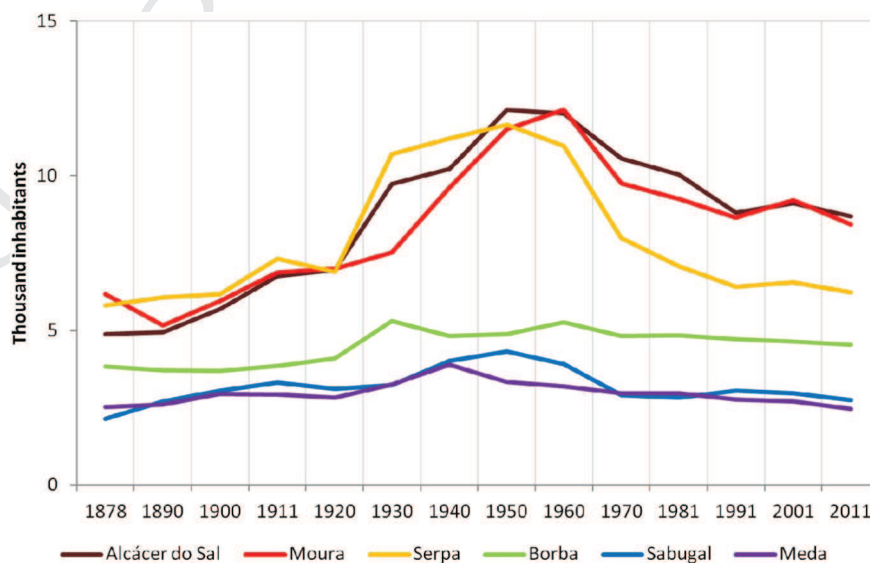


Fig. 2. Type-1 cities: Persistent Early Shrinkage: Exodus from rural periphery.

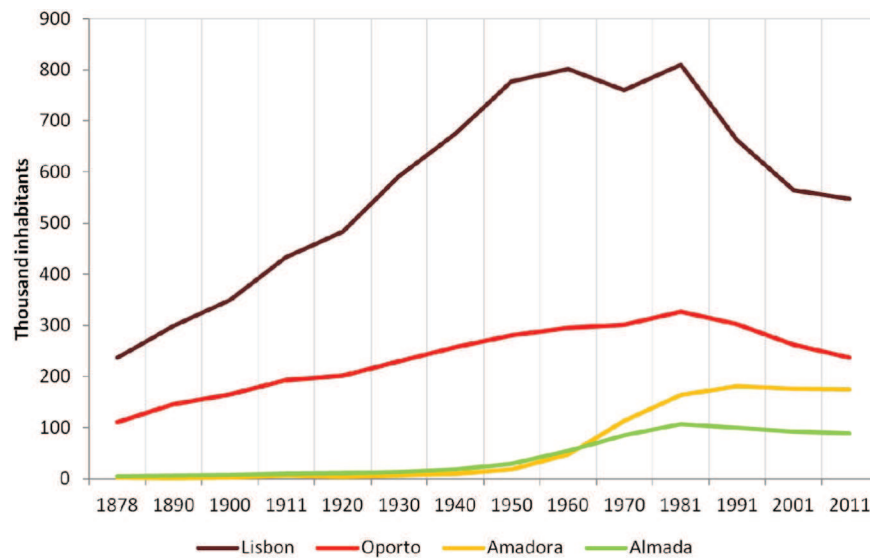


Fig. 3. Type-2 cities: Metropolitan Shrinkage: Urban sprawl challenges.

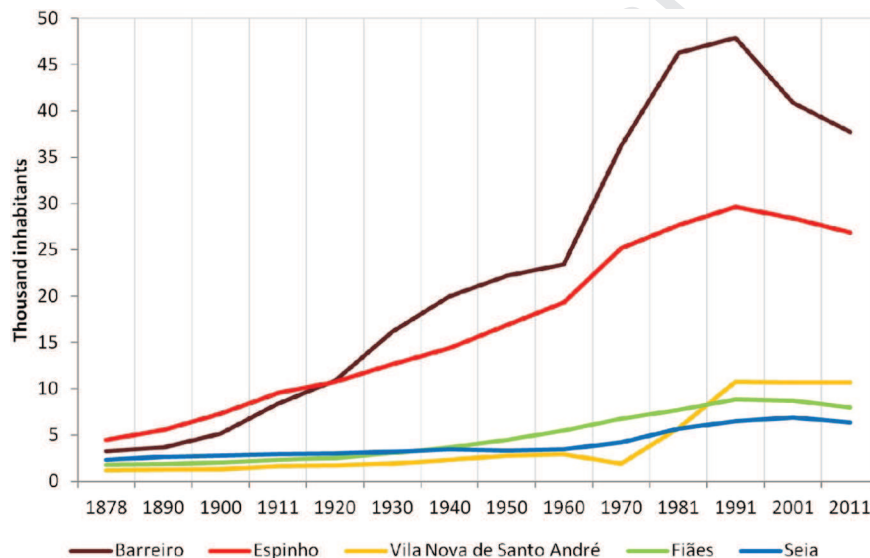


Fig. 4. Type-3 cities: Recent Shrinkage: De-industrialisation hotspots.

of the cities classified in type 2, “Metropolitan Shrinkage: Urban sprawl challenges” (classified in Table 1 as TS2, L1, S1, T3, D2, and C2) (Fig. 3). In fact, if Lisbon, Oporto, Almada, and Amadora are removed from the data set, the rest of the cities show a path of much slower growth, especially in the first half of the twentieth century. Three cities were affected by suburbanization from the 1980s, namely, Lisbon, Oporto, and Almada, and in the case of Amadora from the 1990s. The use of an urbanization ratio (Q)² (Table 2) allows an in-depth analysis to be made of the population trajectory of all 25 shrinking cities, type-2 cities, and the remaining shrinking cities. A ratio value of > 1 implies that the city's population is increasing more quickly than the national population. A ratio value of $[0, 1]$ means that the national population is increasing more quickly than or equal to ($= 1$) that of the analysed set of cities. A ratio equal to 0 implies a constant population in the

selected cities. Negative values represent population decline in the cities compared with the evolution of the Portuguese population (de Vries, 1990).

During the first 40 years (1878–1920), there was an acceleration in the process of urbanization in Metropolitan Shrinkage cities (Table 2). The process of urbanization decreased in intensity in the following period starting in 1920. After the end of WWII, cities included in this type recovered slightly; however, the out-migration that took place during the 1960s generated profound changes, including the loss of the economic and social dynamics of those cities. The decline in the number of inhabitants in Metropolitan Shrinkage cities from the 1980s, registering a greater rate of reduction up to 2001 and subsequently slowing, is the main explanation for the observed overall decline in the population of the 25 shrinking cities.

The two most important cities of Portugal, Lisbon and Oporto, showed rapid growth until the 1920s, which was later reinforced by the simultaneous growth of the Metropolitan Area of Lisbon after World War II, as reflected in the population trajectories of Amadora and Almada (Fig. 3). The continuous population growth observed until

² The ratio is defined as: $Q = [(U_2 - U_1)/(P_2 - P_1)] / (U_1/P_1)$, where U_2 and U_1 are the number of inhabitants in the last and first dates of each column range in the selected cities, respectively, and P_2 and P_1 are the number of inhabitants in Portugal in the last and first dates of each column range, respectively.

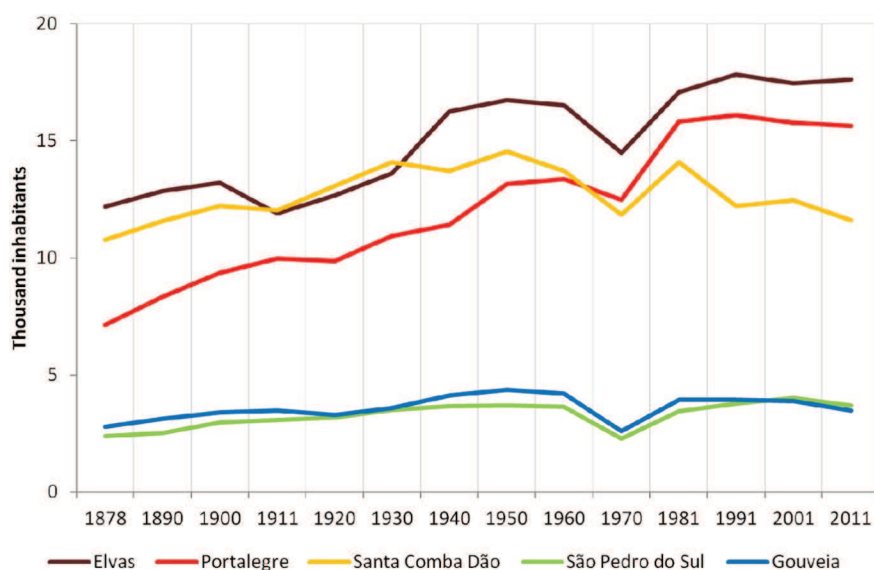


Fig. 5. Type-4 cities: Cyclic shrinkage: Political transformation cores (the colonial war and fall of the dictatorship in 1974).

the 1960s in both Lisbon and Oporto slowed down because of the out-migration to Europe that affected the entire country, as well as because of suburbanization and the subsequent growth of peripheral cities. The change in population between the 1960s and the 1980s in Lisbon and Oporto is somewhat artificial, as a stabilization or a decrease in the trajectory of population was observed until that time, thus postponing the beginning of the shrinkage process in these two cities by about two decades. After 1981, Lisbon and Oporto began to lose inhabitants, as shown by the high negative values for the urbanization ratio (Table 2). In addition to the factors already mentioned, the impact of high prices of real estate and degradation of housing conditions are factors that help explain the trend of population loss in more recent years, a feature that is common to several European metropolitan areas (Abrantes, Pimentel, & Tenedório, 2010, p. 72).

Cities such as Almada, Amadora, Barreiro, Espinho, Fiães, and Vila Franca de Xira benefited from suburbanization as recipients of residents (1960–1980), allowing some of these places to be formally classified as “cities” after the 1960s. However, from the 1980s, Almada and Amadora started to experience the same phenomenon that had earlier been the cause of their growth, namely, suburbanization. It should be noted

that the population peak registered in the 1970s in Almada and Amadora was a result of in-migration emerging from the decolonization of Portugal’s overseas territories, with the political circumstances for such migration having been generated by the establishment of a democratic regime (after the Carnation Revolution, a coup in April 1974) and by the return of some of the previous emigrants.

Although the economic and social transformations produced by the transfer of industrial jobs from the hinterland to coastal areas penalized Persistent Early Shrinkage cities (Fig. 2), this process was beneficial for type-2 and type-3 cities (Figs. 3 and 4). All cities included in types 2 and 3, with the exception of Seia, are located in the so-called Atlantic industrial corridor, which benefited from the “positive impact of the joint forces between railways and ports” (Mata, 2008, p. 178).

In type-3 cities, “Recent Shrinkage: De-industrialisation hotspots” (TS2, L1, S2, T2, D4, and C4 in Table 1), the identified shrinkage after 1991 was a result of a lack of economic diversification, as argued by Friedrichs (1993). With respect to this city type, Seia is an exception because the city faced a slight decline between 1940 and 1960 related to a crisis in the textile industry (Carvalho, 2006), the city’s main economic driver, and has shrunk since 2001. In the cases of Barreiro, 411

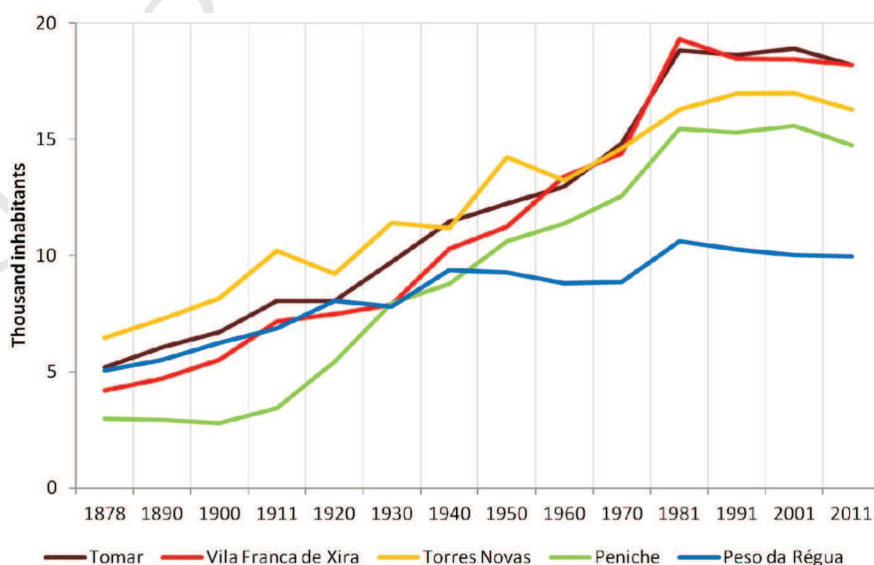


Fig. 6. Type-5 cities: Mild shrinkage: Life-style disamenity.

Table 2

Values of the urbanization ratio (Q) for shrinking cities.

Q	1878–1900	1900–1920	1920–1940	1940–1960	1960–1981	1981–2001	1981–2011
Total shrinking cities (N = 25)	2.337	2.364	1.368	1.484	1.460	–3.319	–1.703
Cities of the type “Metropolitan Shrinkage: Urban sprawl challenges” (N = 4)	2.679	2.545	1.386	1.602	1.381	–3.935	–1.952
Remaining cities (N = 21)	1.090	1.543	1.279	0.879	1.904	–0.046	–0.373

Table 3

Rates of population change (%) for Persistent Early Shrinkage and Cyclic Shrinkage cities, 1878–2011.

	1878–1900	1900–1920	1920–1940	1940–1960	1960–1981	1981–2001	1981–2011
Inhabitants in persistent early shrinkage cities	8.4	12.3	41.8	8.4	–22.0	–4.9	–10.7
Inhabitants in cyclic shrinkage cities	16.7	2.1	17.0	4.6	5.7	–1.5	–4.4

Espinho, and Fiães, rapid growth in the 1950s led to the birth of the metropolitan areas of Lisbon and Oporto and included the economic development induced by rapid industrialization, especially in Barreiro with its chemical industry. Nevertheless, it was the same rapid expansion based on a poorly diversified economy that led to the subsequent population decline. The reduction in the quality of life between 1993 and 2004 (Moreira et al., 2009) may have contributed to the recent/current shrinkage of these three cities categorized as de-industrialization hotspots. The process in Vila Nova de Santo André was even more transformative. Until the 1970s, this city was a small fishing village, which became quickly transformed by the opening of the port and industrial complex of Sines and the subsequent influx of people attracted by the new employment opportunities (Dias & Alves, 2010).

Cities of types 4 and 5 are located in contrasting geographic settings, thus requiring different policy approaches, which justifies their separate analysis. Those cities present slight declines in population in the later period of the analysis (i.e. 2001–2011).

The cities of type 4, “Cyclic Shrinkage: Political transformation cores” (TS1, L2, S3, T1, D3, and C1 in Table 1) (Fig. 5), are inland cities and are located predominantly in the central part of the country. These cities have population trajectories bearing some similarities to those of Persistent Early Shrinkage cities. Cyclic Shrinkage cities also present a pattern of alternating growth and shrinkage, although in the case of Persistent Early Shrinkage cities the growth alternates with stagnation and in Cyclic Shrinkage cities there are alternations between growth and shrinkage. Moreover, in Cyclic Shrinkage cities the decline occurred only after the 1980s, whereas Persistent Early Shrinkage cities showed decline at least from the 1960s. These results are presented in Table 3, which compares the rates of population evolution in Persistent Early Shrinkage and Cyclic Shrinkage cities. The fluctuations registered in the cities with cyclic shrinkage were due mainly to out-migration influenced by the colonial war (1961–1974), the poor living conditions, and political persecution during the dictatorship, which was intensified from the 1960s with the radicalization of actions of those opposing the regime. Out-migrants moved mostly into Europe, which affected Gouveia, São Pedro do Sul, and Santa Comba Dão. During the 1960s, these movements into Europe were accompanied by the internal migration of inhabitants from cities included in the Cyclic Shrinkage category to coastal cities, mainly involving inhabitants of Alentejo (a region that includes the cities of Portalegre and Elvas), and predominantly to the metropolitan area of Lisbon; these inhabitants were exiting a region that was based on an agricultural economy to seek employment in “industrial activities” (Sena, 2011, pp. 1685–1686). During the 1970s, Cyclic Shrinkage cities recovered population as a result of the political transformation of Portugal from dictatorship to democracy, which brought about the return of those living in the former Portuguese colonies. After the 1980s, given the lack of job opportunities and the lower quality of life offered by those cities compared with coastal cities,

many residents moved into coastal cities or even migrated to other countries in search of better economic and social conditions; however, with the exception of Santa Comba Dão, where city and municipality geographically coincide, the decline was almost imperceptible. In Gouveia, São Pedro do Sul, Portalegre, and Elvas, the associated municipalities experienced an accentuated population decline (–14.8% for the period 1981–2011), which has not yet reached the cities because inhabitants from rural areas of the municipalities have first moved into cities, thus delaying city shrinkage.

Cities of type 5, “Mild Shrinkage: Life-style disamenity” (TS1, L2, S2, T1, D4, and C2 in Table 1) (Fig. 6), probably also benefited from the population wave from the former colonies, from Europe, and from the Portuguese hinterland. Almost all Mild Shrinkage cities show a path characterized by growth and decline, but with a significant growth trend from 1878 to 1981 (Fig. 6). The exception is Peso da Régua, which has a flatter population curve. Mild Shrinkage cities are average-sized cities (in the context of Portugal) and are included, with the exception of Peso da Régua, either in the Metropolitan Area of Lisbon (Vila Franca de Xira) or within its area of influence (Peniche, Tomar, and Torres Vedras). However, Mild Shrinkage cities showed quality of life index values below national average values from 1993

Table 4

Population change in shrinking Portuguese cities during the last 20 years. Source: INE (2012).

		Change in population 1991–2011	Change in population 1991–2011 (%)	t4.4
Type of shrinking city				
Persistent early shrinkage:	Alcácer do Sal	–138	–1.6	
	Borba	–181	–3.8	t4.8
	Meda	–305	–11.0	t4.9
	Moura	–224	–2.6	t4.30
	Exodus from rural periphery	Sabugal	–300	–9.9
Metropolitan shrinkage: Urban sprawl challenges	Serpa	–174	–2.7	t4.72
	Almada	–10,956	–10.9	
	Amadora	–6638	–3.7	t4.13
	Lisbon	–115,661	–17.4	t4.16
	Oporto	–64,881	–21.5	t4.17
Recent shrinkage: De-industrialisation hotspots	Barreiro	–10,172	–21.2	
	Espinho	–2726	–9.2	t4.28
	Fiães	–851	–9.6	t4.29
	Seia	–123	–1.9	t4.20
	V. Nova de Sto. André	–104	–1.0	t4.24
Cyclic shrinkage: Political transformation cores	Elvas	–207	–1.2	
	Gouveia	–465	–11.8	t4.27
	Portalegre	–454	–2.8	t4.25
	Sta Comba Dão	–612	–5.0	t4.28
	S. Pedro do Sul	–93	–2.5	t4.26
Mild shrinkage: Life-style disamenity	Peniche	–555	–3.6	t4.29
	Peso da Régua	–318	–3.1	t4.30
	Tomar	–427	–2.3	t4.33
	Torres Novas	–656	–3.9	t4.31
	V. Franca de Xira	–290	–1.6	t4.34
			t4.32	t4.35
			t4.36	

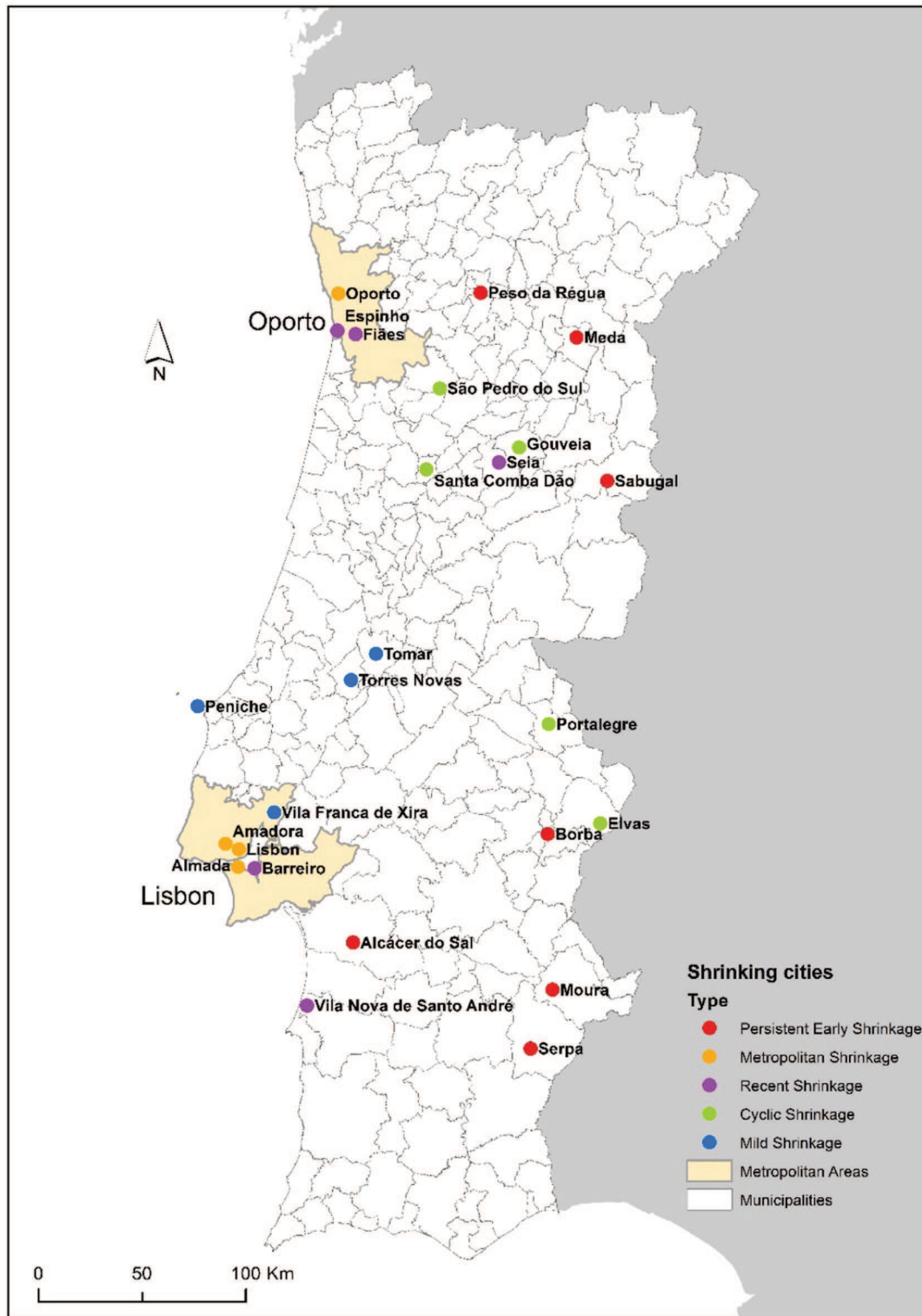


Fig. 7. The spatial distribution of shrinking cities in Portugal, 1991–2011, coded by city type. Source: INE (2012).

to 2004 (Moreira et al., 2009). This may explain the stagnation that those cities have undergone in the last 30 years. Moreover, all these cities are secondary cities that have grown as satellites of other cities—Peso da Régua for Vila Real, Torres Novas for Santarém, Tomar for Leiria, Peniche for Caldas da Rainha, and Vila Franca de Xira for Lisbon—all of which have exhausted their capacity for attracting inhabitants, either because of a possible saturation in the phenomenon of suburbanization, or because new products and associated appealing

jobs tend to be generated in growing environments such as metropolitan areas, in accordance with the product-life-cycle theory.

5. Conclusions

The population trajectories of Portuguese cities from 1870 to 2011 showed mostly slow growth, interrupted in some instances by periods of stagnation or even decline. Three major transformations explain the

loss of inhabitants. The first period of population loss, during and after the 1960s, was due to economic transformations that affected inland cities (cities categorized as type “Persistent Early Shrinkage: Exodus from rural periphery”), specifically, the attraction of industrial jobs in coastal cities. The second period of population loss, during and after the 1980s, was associated with the emergence of suburbanization (cities categorized as type “Metropolitan Shrinkage: Urban sprawl challenges”). The third, during and after the 1990s, occurred as an outcome of profound transformations in industrial cities (cities categorized as type “Recent Shrinkage: De-industrialisation hotspots”). Cities of these three types experienced events that represented a turning point in the path of population evolution, from which the cities were unable to recover, indicating a low level of resilience. Therefore, further research should focus on identifying the characteristics that can reinforce the resilience of such cities. Such an approach implies that governments need to learn how to cope with and manage change so that ways of orienting these cities towards more desirable directions can be identified.

However, other cities have shown a more persistent pattern of growth and decline in their populations. Cyclic shrinkage is evident in cities where political transformations brought about a loss of inhabitants between the 1960s and the 1970s with recovery in the 1980s, but although such cities are currently in decline, most have not yet reached the population minima of the 1970s. Mild Shrinkage cities, resulting from life-style disamenity, presented irregular paths of population growth until the 1980s, since when there have been small declines but no particularly substantial changes in the number of inhabitants.

Population records over the last 130 years for currently (1991–2011) shrinking cities show that different patterns of evolution have coexisted in time. Whereas some cities show a consistent trend of growth and episodic decline, others show a more erratic behaviour where growth and decline alternate, consistent with a life-cycle explanation for city evolution. The present work empirically shows that continuous decline and life-cycle theories can be sustained simultaneously in the same country and period and that their integration allows a deeper and more fruitful understanding of the evolution of cities. This result reinforces the argument that both realities can coexist, and thus a more accurate interpretation of the reality benefits from an integrative analysis of population decline. Accepting that a regularity in the stages of urban development does not exist either in Portuguese or other Western European cities, generalist approaches such as “one-size-fits-all” policies can no longer be suitably applied. This observation opens space for a different set of policies to be developed that aim to deal with urban shrinkage and smart growth. Resilience theory should prove helpful for formulating policies that use the strengths of the cities and their available opportunities as assets for innovation. This approach reinforces the capability for adaptation in a complex social–ecological system such as that represented by each city. The case of Portugal shows that cities built on multidimensional characteristics have higher resilience compared with other cities when confronted with stressors.

The analysis of the historical population trajectories of cities allowed distinctive patterns of urban evolution to be identified that would have been indistinguishable using a shorter temporal span, and was therefore able to portray plural shrinkage realities in Portugal. Diverse trajectories have also been found in other Western European countries, in which suburbanization and economic, political, and life-style transformations have been identified as common drivers of urban shrinkage. Furthermore, the findings support theoretical arguments that the population trajectory of a particular city should be analysed in the context of its region and in relation to other cities because of the interconnections that exist between such cities, and therefore the continuous decline and life-cycle theories should also be articulated with the product-life-cycle and post-Keynesian regional growth theories.

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References

- Abrantes, P., Pimentel, D., & Tenedório, J. A. (2010). Metropolitan dynamics typology of the Portuguese urban system. *Open Urban Studies Journal*, 3, 68–77.
- Alexiadis, S. (2013). *Convergence clubs and spatial externalities: Models and applications of regional convergence in Europe*. Berlin: Springer.
- Audirac, I., Cunningham-Sabot, E., Fol, S., & Moraes, S. T. (2012). Declining suburbs in Europe and Latin America. *International Journal of Urban and Regional Research*, 36(2), 226–244.
- Beauregard, R. A. (1993). Representing urban decline. Postwar cities as narrative objects. *Urban Affairs Review*, 29(2), 187–202.
- Beauregard, R. A. (2009). Urban population loss in historical perspective: United States, 1820–2000. *Environment & Planning A*, 41(3), 514–528.
- van den Berg, L., Klaassen, L. H., Rossi, A., & Vijverberg, C. H. T. (1982). *Urban Europe. A study of growth and decline*. Oxford: Pergamon.
- Berry, B. J. L. (Ed.). (1977). *Urbanization and counter urbanization. Urban affairs annual reviews. vol. II*. London: Sage.
- Buzar, S., Ogden, P., Hall, R., Haase, A., Kabisch, S., & Steinführer, A. (2007). Splintering urban populations: Emergent landscapes of reurbanisation in four European cities. *Urban Studies*, 44(4), 651–677.
- Carvalho, M. F. C. P. (2006). Viver os têxteis: um complexo museológico Para o concelho de Seia. *Fundamentos e proposta de organização*. Coimbra: Universidade de Coimbra.
- Champion, A. (2001). A changing demographic regime and evolving polycentric urban regions: Consequences for the size, composition and distribution of city populations. *Urban Studies*, 38(4), 657–677.
- Cheshire, P. (1995). A new phase of urban development in western Europe? The evidence for the 1980s. *Urban Studies*, 32(7), 1045–1063.
- Cheshire, P., & Magrini, S. (2006). Population growth in European cities: Weather matters – but only nationally. *Regional Studies*, 40(1), 23–37.
- Clark, D. (1989). *Urban decline: The British experience*. London: Routledge.
- Cortese, C., Haase, A., Grossmann, K., & Ticha, I. (2014). Governing social cohesion in shrinking cities: The cases of Ostrava, Genoa and Leipzig. *European Planning Studies*, 22(10), 2050–2066.
- COST (2012). *COST Action TU0803 Cities regrowing smaller [Internet] cited 2012 Jun 20*. Available from <http://www.shrinkingcities.eu>
- Couch, C., Karecha, J., Nuissl, H., & Rink, D. (2005). Decline and sprawl: an evolving type of urban development – Observed in Liverpool and Leipzig. *European Planning Studies*, 13(1), 117–136.
- Cunningham-Sabot, E., & Fol, S. (2007). Shrinking cities in France and Great Britain: A silent process? *Proceedings of the conference: The future of shrinking cities – Problems, patterns and strategies of urban transformation in a global context*. Berkeley: University of California, Institute of Urban and Regional Development (February).
- Dias, E., & Alves, J. F. (2010). Ports, policies and interventions in ports in Portugal – 20th century. *Cahiers de La Méditerranée*, 80, 41–64.
- Elzerman, K., & Bontje, M. (2015). Urban shrinkage in Parkstad Limburg. *European Planning Studies*, 23(1), 87–103.
- Ferrão, J., & Marques, T. S. (2003). *National urban system – Overview*. Lisboa: DGOTDU.
- Friedrichs, J. (1993). A theory of urban decline: economy, demography and political elites. *Urban Studies*, 30, 907–917.
- Gaspar, J., & Jensen-Butler, C. (1992). Social, economic and cultural transformations in the Portuguese urban system. *International Journal of Urban and Regional Research*, 16(3), 442–461.
- Geys, B., Heinemann, F., & Kalb, A. (2007). Local governments in the wake of demographic change: Efficiency and economies of scale in German municipalities. *Paper available at ZEV – Zentrum für Europäische Wirtschaftsforschung/Center for European Economic Research, discussion paper 07–036*.
- Großmann, K., Haase, A., Rink, D., & Steinführer, A. (2008). Urban shrinkage in east Central Europe? Benefits and limits of a cross-national transfer of research approaches. In M. Nowak, & M. Nowosielski (Eds.), *Declining cities/developing cities: Polish and German perspectives* (pp. 77–99). Poznań: Instytut Zachodni.
- Guimarães, M. H., Barreira, A. P., & Panagopoulos, T. (2014). Shrinking cities in Portugal – Where and why. *Paper presented at the 20th APDR congress, 10–11 July, Évora, Portugal* (pp. 706–721).
- Haase, A., Bernt, M., Grobmann, K., Mykhnenko, V., & Rink, D. (2013). Varieties of shrinkage in European cities. *European Urban and Regional Studies*, 1–17.
- Haase, A., Rink, D., Grossmann, K., Bernt, M., & Mykhnenko, V. (2014). Conceptualizing urban shrinkage. *Environment & Planning A*, 46, 1519–1534.
- Hoekveld, J. J. (2014). Understanding spatial differentiation in urban decline levels. *European Planning Studies*, 22(2), 362–382.
- Holling, C. S. (1973). Resilience and stability of ecological systems. *Annual Review of Ecology and Systematics*, 4, 1–23.
- Klingholtz, R. (2009). Europe's real demographic challenge. *Policy Review*, 32, 60–70.
- Levitt, T. (1965). Exploit the product life cycle. *Harvard Business Review*, 43, 81–94.

- Martinez-Fernandez, C., Audirac, I., Fol, S., & Cunningham-Sabot, E. (2012). Shrinking cities: Challenges of globalization. *International Journal of Urban and Regional Research*, 36(2), 213–225.
- Mata, M. E. (2008). As bees attracted to honey. Transport and job mobility in Portugal, 1890–1950. *The Journal of Transport History*, 29(2), 173–192.
- Metzger, J. T. (2000). Planned abandonment: The neighborhood life-cycle theory and national urban policy. *Housing Policy Debate*, 11, (pp. 7–40).
- Moreira, M. J. G., Rodrigues, T. F., & Henriques, F. C. (2009). O sistema urbano português: Dinâmicas contemporâneas e diversidade regional. Evolução demográfica e bem-estar social. *Revista de Demografia Histórica*, XXVII(1), 83–114.
- Mykhnenko, V., & Turok, I. (2008). East European cities — Patterns of growth and decline, 1960–2005. *International Planning Studies*, 13(4), 311–342.
- Nunes, A. B. (1989). *A rede Urbana Portuguesa e o moderno crescimento económico (provas complementares de doutoramento em economia)*. Lisboa: Universidade Técnica de Lisboa.
- Nunes, A. B. (1996). Portuguese urban system: 1890–1991. In P. T. Pereira, & M. E. Mata (Eds.), *Urban dominance and labour market differentiation of a European capital city: Lisbon, 1890–1990* (pp. 7–47). London: Springer.
- Oswalt, P. (Ed.). (2005). *Shrinking cities: International research*. Vol. 1. Ostfildern: Hatje Cantz.
- Oswalt, P., & Rieniets, T. (Eds.). (2006). *Atlas of shrinking cities*. Ostfildern: Hatje Cantz Verlag.
- Pallagst, K., Aber, J., Audirac, I., Cunningham-Sabot, E., Fol, S., Martinez-Fernandez, C., ... Rich, J. (2009). *The future of shrinking cities: Problems, patterns and strategies of urban transformation in global context*. Berkeley, CA: IURD.
- Reher, D. S. (1994). Ciudades, procesos de urbanización y sistemas urbanos en la península ibérica, 1550–1991. In M. Guàrdia, I. Bassols, F. X. Monclús, & J. L. Oyón (Eds.), *Atlas histórico de ciudades europeas: Península Ibérica* (pp. 1–30). Barcelona: Salvat.
- Rust, E. (1975). *No growth: Impacts on metropolitan areas*. Lexington, MA: Lexington Books.
- Sena, A. P. S. F. (2011). Notas sobre a emigração Portuguesa no Pós Guerra (1939–1945). *Revista de Estudos Extremeños*, LXVII(III), 1681–1700.
- Silva, Á. F. (1997). A evolução da rede urbana Portuguesa (1801–1940). *Análise Social*, XXXII(143–144), 779–814.
- Silveira, L. E., Alves, D., Painho, M., Costa, A. C., & Alcântara, A. (2013). The evolution of population distribution on the Iberian peninsula: A transnational approach (1877–2001). *Historical Methods: A Journal of Quantitative and Interdisciplinary History*, 46(3), 157–174.
- Soares, N. P. (1998). *O sistema urbano português: 1890–1991*. Lisboa: Faculdade de Ciências Sociais e Humanas.
- Turok, I., & Mykhnenko, V. (2007). The trajectories of European cities, 1960–2005. *Cities*, 24(3), 165–182.
- Vale, L. J., & Campanella, T. J. (2005). *The resilient city: How modern cities recover from disaster*. New York: Oxford University Press.
- de Vries, J. (1990). Problems in the measurement, description and analysis of historical urbanization. In A. van der Woude, A. Hayami, & J. de Vries (Eds.), *Urbanization in history: A process of dynamic interactions* (pp. 43–61). Oxford: Clarendon Press.
- Wu, C. -T., Zhang, X. -L., Chu, G. -H., & Chu, S. -P. (2013). Shrinkage and expansion in peri-urban China. In K. Pallagst, T. Wiechmann, & C. Martinez-Fernandez (Eds.), *Shrinking cities: International perspectives and policy implications*. Routledge Advances in Geography.